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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/979,505	01/11/2002	Takatomo Sasaki	2001-1739A	5933

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WENDEROTH, LIND & PONACK, L.L.P.
2033 K STREET N. W.
SUITE 800
WASHINGTON, DC 20006-1021

EXAMINER
SONG, MATTHEW J

ART UNIT PAPER NUMBER

1765

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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/979,505

Examiner

Matthew J Song

Applicant(s)

SASAKI ET AL

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Peri d f r Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED. (35 U.S.C. § 139).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 3-10 and 13-18 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 3-10 and 13-18 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on ____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) and (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 7.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). ____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 3-4, 13-16 and 18 are rejected under 35 U.S.C. 102(b) as being anticipated by Nishizawa (US 4,874,458).

Nishizawa discloses a Czochralski method of growing a single crystal, note entire reference, comprising a baffle member 16 in a raw material melt in a crucible 7 where polycrystalline GaAs is placed in the crucible and a heating means 11 is used to melt the GaAs and a rod 8 was rotated to have a seed crystal contacted thoroughly with the feed melt 12, while the crucible is rotated in the opposite direction and a single crystal is pulled in the vertical direction (col 7, ln 1-67 and col 5, ln 1-67). Nishizawa also discloses the crucible and/or the baffle plate is rotated during the single crystal pulling operation, this reads on applicant's without rotating the baffle member when growing the single crystal (col 3, ln 10-25). Nishizawa discloses growing a single crystal by the Czochralski method of contacting a seed crystal with a raw material melt and pulling a crystal vertically; it is inherent to the Czochralski to grow a crystal by slowly cooling the raw material melt with which the seed crystal makes contact below liquid level to precipitate a single crystal on the surface of the seed crystal. Also Nishizawa

discloses a plurality of heaters **11a, 11b, 11c, 11d**, which control the temperature of the crucible in the vertical direction, which reads on applicant's cooling mechanism.

Referring to claim 4, Nishizawa discloses rotating the seed crystal (col 7, ln 30-45).

Referring to claim 13, Nishizawa discloses a baffle member **16** arranged in the crucible **7**, a rotating material for rotating the crucible **5** and a seed attached to a crystal pulling rod which cools a raw material melt to form a single crystal and a plurality of heaters **11a, 11b, 11c, 11d**, this reads on applicant's cooling mechanism.

Referring to claim 14, Nishizawa discloses a rotation drive mechanism **9** for rotating a crystal pulling rod which is attached to a seed crystal (col 5, ln 10-40).

Referring to claim 15-16 and 18, Claims directed to apparatus must be distinguished from the prior art in terms of structure rather than function (MPEP 2114). Claims 15 and 16 are only further limiting by claiming an intended use of the claimed apparatus. Nishizawa discloses all of the structural limitations of the claimed invention and would inherently be capable of performing the claimed intended use.

3. Claims 13-16 and 18 are rejected under 35 U.S.C. 102(b) as being anticipated by Atami et al (US 5,871,581).

Atami et al discloses a crystal growing apparatus, note entire reference, comprising a baffle member **31** arranged in a raw material melt in a crucible **3**, which is mounted on a susceptor **15**, which sits on a vertical shaft **14** and can be rotated in a horizontal plane, this reads on applicant's rotating material. Atami et al also discloses a seed crystal of the single crystal of the semiconductor is attached to a pulling wire and is immersed in a semiconductor melt and

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then raised up and a grown single crystal of the semiconductor is pulled up in an inert atmosphere, this reads on applicant's cooling mechanism for slowly cooling the raw material melt because dipping the seed crystal causes the melt to cool to a solid state (col 2, ln 1-67 and col 3, ln 1-67 and Fig 1).

Referring to claim 14, Atami et al also discloses a pulling wire **24** which forms part of a pulling mechanism is configured so as to movable up and down with continuous rotation and a seed crystal is attached to the pulling wire (col 3, ln 10-25), this reads on applicant's mechanism for rotating the seed crystal.

Referring to claims 15-16 and 18, Claims directed to apparatus must be distinguished from the prior art in terms of structure rather than function (MPEP 2114). Claims 15 and 16 are only further limiting by claiming an intended use of the claimed apparatus. Atami et al discloses all of the structural limitations of the claimed invention and would inherently be capable of performing the claimed intended use.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 5-8 and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nishizawa (US 4,874,458) in view of Sasaki et al (EP 0786542 A1)

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Nishizawa discloses all of the limitations of claim 5, as discussed previously, except a single crystal of oxide is grown.

In a method of forming a crystal, note entire reference, Sasaki et al teaches a cesium lithium borate crystal ($\text{CsLiB}_6\text{O}_{10}$) was grown by a seeding method (Example 1). Sasaki et al also teaches doping of a crystal by through mixing of compounds such as oxide and carbonates during preparation of a crystal, where Al and Ga are used as dopants to form $\text{Cs}_{1-x}\text{Li}_{1-y}\text{M}_{x+y}\text{B}_6\text{O}_{10}$ (pg 3, col 15-55 and claim 1). It would have been obvious to a person of ordinary skill in the art at the time of the invention to modify Nishizawa with Sasaki et al to grow a cesium-lithium borate crystal, which is useful as a wavelength converting nonlinear optical crystal for a laser oscillator (pg 2, ln 5-10).

6. Claim 5-6, 9 and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nishizawa (US 4,874,458) in view of Furuya et al (Development of New Nonlinear Optical Crystal GdYCOB with Tunable Birefringence).

Nishizawa discloses all of the limitations of claim 5, as discussed previously, except a single crystal of oxide is grown.

In a method of forming a crystal by the Czochralski method, Furuya et al teaches a $\text{Gd}_x\text{Y}_{1-x}\text{Ca}_4\text{O}(\text{BO}_3)_3$ grown by the Czochralski method (Abstract). It would have been obvious to a person of ordinary skill in the art at the time of the invention to modify Nishizawa with Furuya et al to form a $\text{Gd}_x\text{Y}_{1-x}\text{Ca}_4\text{O}(\text{BO}_3)_3$ crystal which is useful in controlling the birefringence in nonlinear optical crystals.

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7. Claims 5, 10 and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nishizawa (US 4,874,458) in view of Nitanda et al (US 5,359,452).

Nishizawa discloses all of the limitations of claim 5, as discussed previously, except a single crystal of oxide is grown.

In a method of forming a crystal, note entire reference, Nitanda et al teaches a LiTaO_3 mixture is placed into a crucible and melt and then a seed was then dipped into the melt to grow a monocrystal by the Czochralski method (Embodiment 2). It would have been obvious to a person of ordinary skill in the art at the time of the invention to modify Nishizawa with Nitanda et al to form a Lithium Tantalate monocrystal, which is useful in surface acoustic elements (col 3, ln 50-67)

Conclusion

8. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Metter (US 5,683,281) teaches in a Czochralski technique a seed crystal is immersed in a molten pool of silicon and this triggers solidification and precipitation of silicon (col 1, ln 10-67), therefore immersing a seed crystal inherently cools the raw material melt to a temperature which triggers solidification.

Sasaki et al (US 6,296,784) teaches a cesium lithium borate crystal and forming borate crystals using crystal pulling methods (col 2-4).

Jiyunji (JP 63-159284) teaches a crystal pulling up device comprising a rotating member baffle member without rotating a seed crystal (Abstract).

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9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Matthew J Song whose telephone number is 703-305-4953. The examiner can normally be reached on M-F 9:00-5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Benjamin L Utech can be reached on 703-308-3868. The fax phone numbers for the organization where this application or proceeding is assigned are 703-872-9310 for regular communications and 703-872-9311 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0661.

Matthew J Song
Examiner
Art Unit 1765

MJS
December 16, 2002


BENJAMIN L. UTECH
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 1700